d. It will be noted that the intermediary variables I, J and V are used, these variables being defined in the flow diagram of FIG. 4a.

At last, the buoy **1** is obviously anchored, that being indicated by the buoy-rope **7**. The orientation of the buoy is stabilized by a floating anchor **8**.

I claim:

1. Apparatus with accelerometers and magnetometers for measuring the surface characteristics of a sea swell, said apparatus comprising a floating buoy having a main plane which follows the free surface of the water, first accelerometer means mounted on the buoy and oriented along an axis which is perpendicular to the main plane of the buoy, a pair of mutually perpendicular accelerometer means mounted in the main plane, and three magnetometer means, one of said magnetometer being mounted along and coincident with individually associated ones of each of the three axes of the accelerometers, data processor means coupled to be driven by said accelerometers and magnetometers, said data processor means including means for deriving an acceleration vector (h) perpendicular to the free surface of the water responsive to the swell, finding the sum of the acceleration vector (h) due to the swell and the projection of the gravity vector (g) along the axis of the buoy responsive to the accelerometer oriented perpendicular to the main plane, measuring the components of the projection of the gravity vector (g) in the main plane of the buoy responsive to the mutually perpendicular pair of accelerometers mounted on the main plane of the buoy, finding the projection of the gravity vector (g) along the axis perpendicular of the buoy responsive to

the value of the gravity vector (g) and the values of the gravity vector components of (g) in the main plane of the buoy, and giving the value of said projection of the gravity vector responsive to the value measured by the first accelerometer for obtaining the value of the acceleration vector (h) due to the swell.

2. Apparatus according to claim **1**, and said data processor means includes means responsive to the value of the projection of the gravity vector g along the axis perpendicular to the main plane of the buoy for deriving the angle of said axis with respect to a vertical line thus directly giving the slope of the free surface of the water.

3. Apparatus according to claim **2**, wherein said data processor means includes means responsive to the value of the acceleration vector (h) due to the swell and to the angle of the axis with respect to the vertical line for deriving the vertical acceleration due to the swell.

4. Apparatus according to claim **2**, wherein said data processor means includes means responsive to the values measured by the accelerometers for deriving the projection on the horizontal plane of the axis perpendicular to the main plane of the buoy fixed by gravity, and means responsive to the values measured by the magnetometers for deriving the projection of the magnetic field vector B on the horizontal plane fixed by gravity, the angle between said projections giving the direction of the swell.

5. Apparatus according to any one of claims **1** to **4**, wherein the body of the buoy (**1**) is essentially made of a flat disc (**2**).

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